How to Predict Risk?

November 7, 2012

Do quality stocks limit downside risk?

To even test the assumption that quality stocks offer better protection from downward markets, one must be able to identify quality stocks.

After attending an evening presentation by Louis Navellier, I came home and went back to exploring again the free stock grading system on his website. I imported to his site the stocks from the Russell 1000 Value and the Russell 1000 Growth and did some comparisons. While the site publishes the differential results of his various grades, his site doesn't offer historical ratings for doing my own research. So I decided to compare his grades to the Piotroski scores for quality that are published in Stock Investor Pro software from AAII.

When consolidating the Navelier grades into three buckets of A-B, C, and D-F and then doing the same with Piotroski scores having buckets for 1-4, 5-7 and 8-9, we get a nine cell comparison matrix. The Chi Square is 70.62 with a probability of 1.68E-14. (If something happened by chance 1.68 times in a hundred there would be one zero in the scientific notation. Here there would be thirteen zeros before the 168.) when I added the styles of value and growth to the mix, the Chi Square probability increases to 2.79E-21.   So I decided that systems using fundamentals to identify a quality company, and by inference a quality stock, is not all that difficult to find.

The Piotroski scale identifies how many of nine different fundamental criteria are met. While the Piotroski screen requires that all nine be met, I have found in data covering the last ten years that generally eights do as well as nines, and sevens almost as well. The results vary dramatically depending upon the interaction effect, or in combination with other variables. In this case I discovered that for the previous month, the results were exactly opposite or inverted to what was expected. The stocks meeting one of the criteria did better than the stocks with two, and successively all the way through to the nines.

While it may be obvious to many investors, it was not obvious to me that the market does not always like quality stocks. As markets go through cycles of alternating fear and greed, the taste for risk-off or high-quality stocks alternates with the taste for risk-on or low-quality stocks.

Further Data on Returns from High and Low Quality Stocks

Looking at data for 117 months or almost ten years, the Piotroski returns were the inverse of expected with low quality stocks doing better 36% of the time. These months had an average percent change of 5.3%. The higher quality stocks out-performed lower quality stocks 46% of the time, but had an average monthly change of -2.3%. The remaining 18% of the time the Piotroski ratings did not show a linear return relationship and had a monthly change of .8%, which is close to the overall average of 1.0%.

Looking at the data another way, quality was rewarded 60% of the time when the monthly change was between .57% and 7.61%. Only once (8%) was quality rewarded when change was greater than 7.61%, while 33% of the months with change greater than 7.61% had greater returns from low quality stocks than high quality stocks.

		Frequencies			
Chg >	**Chg <**	**Confirms**	**Flat**	**Inverse**	Total
	0.57	38%	13%	49%	39%
0.57	7.61	60%	13%	27%	51%
7.61		8%	58%	33%	10%

Most of the time when returns are strong, quality is not a good predictor, and low quality is a better predictor than high quality.

In yet one more way to slice the data, quality was rewarded 70% of the time when monthly price change was < 2.6%. Low quality or risk-on stocks were rewarded 68% of the time when monthly change was > 2.6%. (Chi square 44.63.)

		Frequencies			
Chg >	**Chg <**	**Confirms**	**Flat**	**Inverse**	Total
	2.59	70%	16%	14%	60%
2.59		11%	21%	68%	40%

While I found this all very interesting, it would be even more interesting if one could predict when the market would be risk-on and risk-off. In my use of data mining and analyzing the data, I was not able to find such predictors. One approach is to divide the data into very high risk (Piotrioski 1 or 2) and very low risk (Piotrioski 8 or 9) and then find good screen criteria under each with the plan of buying a balance of the two portfolios which would hedge each other. In the end I find it more productive to find criteria that merely encompass the total market but to include fields that assure resilience (high cash to price) and fields that assure high rates of return such as a severe drop in prices and high (but not the highest) standard deviations. Any such analysis must cope with a survivorship bias in that low-quality stocks are twice or more as likely to disappear and thus distort the data. However, bankruptcy stocks usually decline severely before their disappearance, while acquisitions are more abrupt and give significant premiums.

Outside Perspective and Stimulus

A good research article projecting a high-return and risk-on market is provided by Dr. James Paulsen, chief investment strategist for Wells Cap Management, at www.wellscap.com in the current and free *Economic and Market Perspectives* newsletter. (http://a248.e.akamai.net/f/248/47562/14d/ ig.rsys4.net/ responsysimages/str2/__RS_CP__/20121031_EMP.pdf) He presents very interesting efficient frontier charts for risk-on and risk-off periods, and provides reason to think that based on patterns from previous economic recoveries, the market is approaching a risk-on period.

VIX as Predictor

Following the lead of looking at the VIX, I imported monthly VIX values into my data mining analysis covering the last 140 months and found that it is highly predictive of returns.

| **VIX >**	**VIX <**	**1 Yr % Chg**	**1 Qtr % Chg**	**1 Mon% Chg**	**Freq**
	12.34	8.3	4.0	2.21	12%
12.34	14.64	6.8		1.86	12%
14.64	16.44	4.2	1.6	0.20	13%
16.44	18.00	2.6	-0.5	0.64	10%
18.00	19.53	9.0	6.3	2.39	10%
19.53	22.64		-2.1	1.92	7%
22.64	24.62	-5.9	2.7	-0.45	10%
24.62	27.80		1.7		7%
27.80	32.64		7.0	-0.27	8%
32.64		21.7	-3.8	-3.24	8%
All		5.53	1.9	0.61	Approx

The counts or frequency varies slightly as there are fewer months available for twelve months forward than for one month forward.

The percent change in the above table has the outliers at the top and bottom 5% of records capped at the returns of that level in order to avoid idiosyncratic averages.

The relative standard deviations are consistently lower the higher the returns (detail available).

General conclusions might be that the lower the VIX below 16.44 or 18.00 the better the future returns. A VIX between 18.00 and 19.53 is a good bet for the next month, quarter and year. A VIX above 19.53 is dangerous territory except when looking one year out and above 27.80. One possible explanation for the exception one year out is that prices have had time to collapse and regain. The current VIX of 18.42 falls in the high grouping of 9% change for the next year, almost double the average.

The above returns are based on averages, which are heavily influenced by exceptionally high and occasional returns. I looked at a comparison of VIX values and the Russell 3000 percent change for the next month, quarter and year since 1990. Below is an eyeball analysis instead of a statistical analysis, since 275 months is hardly sufficient for good statistical conclusions which would be better done with weekly values.

Percent Change Russell 3000 After One Year
Monthly VIX from 1990 sorted incrementally
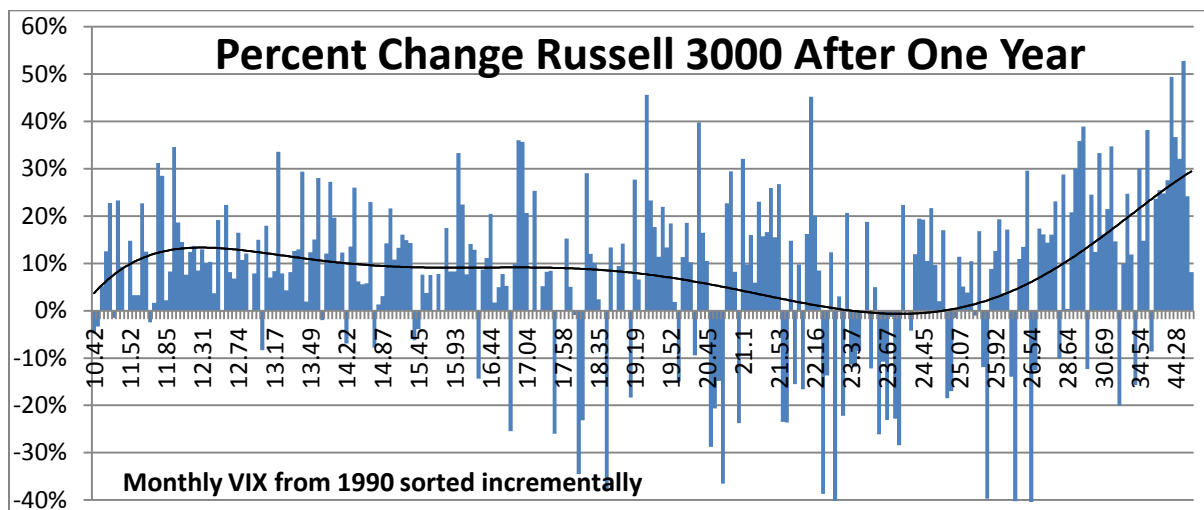
The paucity of negative one-year returns for the 40% of so of the time that the VIX was below 16 is notable. Most of the severe negative returns followed in the year after the VIX was between 20.30 and 26.60. Strong return patterns follow when the VIX is above 26.60.

Percent Change Russell 3000 After One Month
Monthly VIX from 1990 sorted incrementally
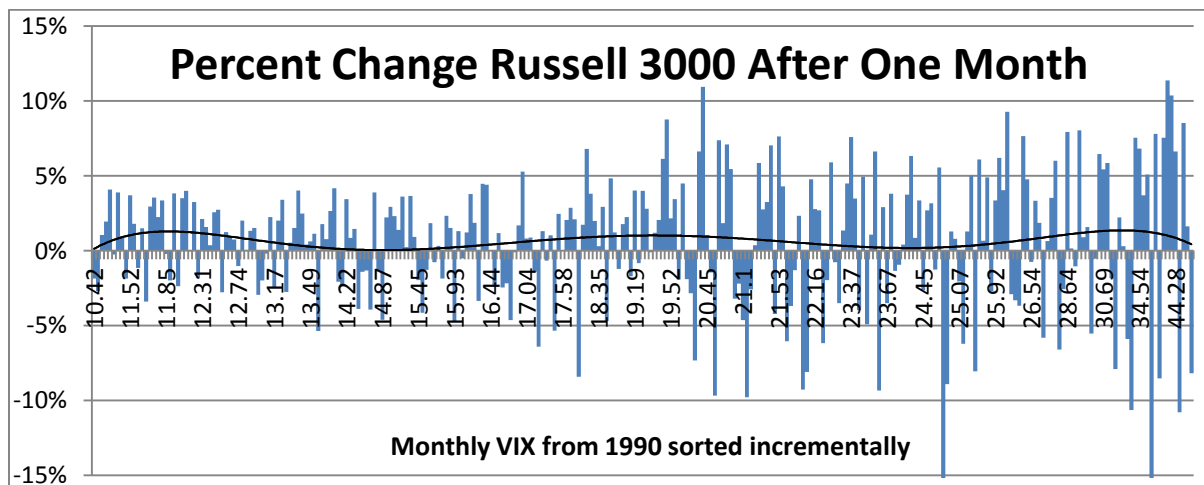
In comparing one-month returns to the one-year returns, when the VIX is below the median of 19 or so, the returns are notably less volatile although the probability of negative returns is higher than for one-year returns.

Percent Change Russell 3000 After One Quarter

Monthly VIX from 1990 sorted incrementally
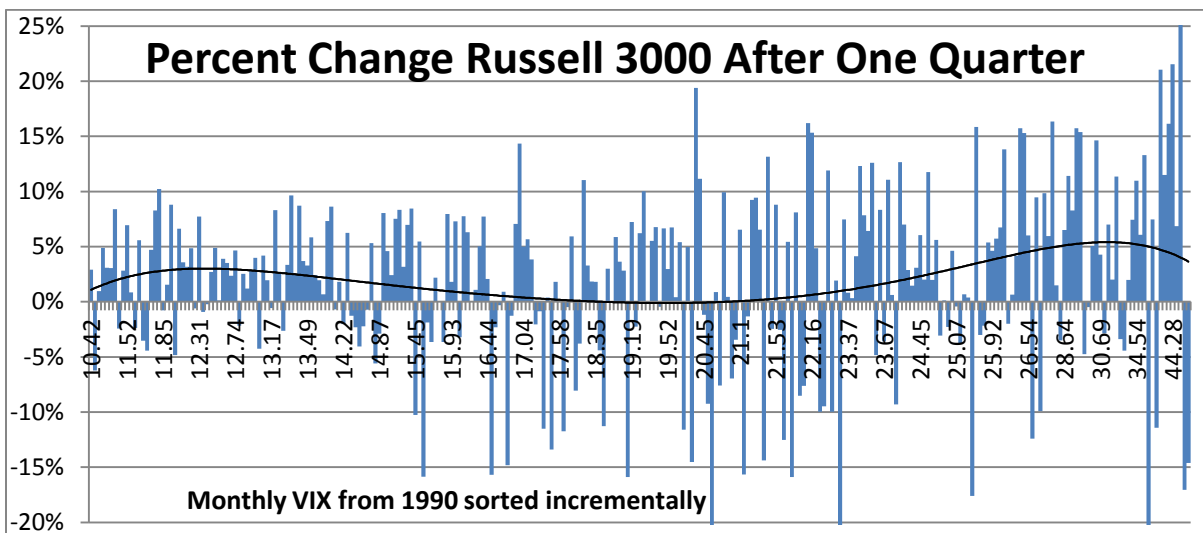
Looking at returns one quarter out, one might conclude that the safest times to be in the market are for the third of the time the VIX is below 15 or so. While there were some severe downturns for the third of the time or so the VIX was above about 27.50, the returns make it worth the risk.

Of course one problem with this analysis is that it doesn't tell you what to do if the VIX is not in a promising position, apart from market timing endeavors.   One can't query to find conditions that currently meet promising criteria, as a current VIX is what it is.

An analysis of the VIX against low and high quality stocks found little interaction effect. The VIX applies about the same to each group, with lower overall returns from lower quality stocks.

The Fractal Dimension Index (FDI) applied to the VIX works well at identifying the end of a VIX range at about FDI 1.6 and the end of a VIX trend at about FDI 1.43.

In the past I have analyzed by the standard deviation of stock returns, in contrast to the VIX which is derived from options.

Indexes for High and Low Quality

When confronted with data that I think holds promise but doesn't immediately reveal its secrets for how to apply it, I find that sometimes the best response is to abandon the large analyses with many variables and many records, and just watch the data as it evolves. So starting with 2011, I put the Piotroski stocks 1 and 2 (low quality) into an index and did the same with the high quality stocks (Piotroski 8 and 9). These indexes are reconfigured at the end of each year. One would think there would be such indexes out there, but I haven't found them.
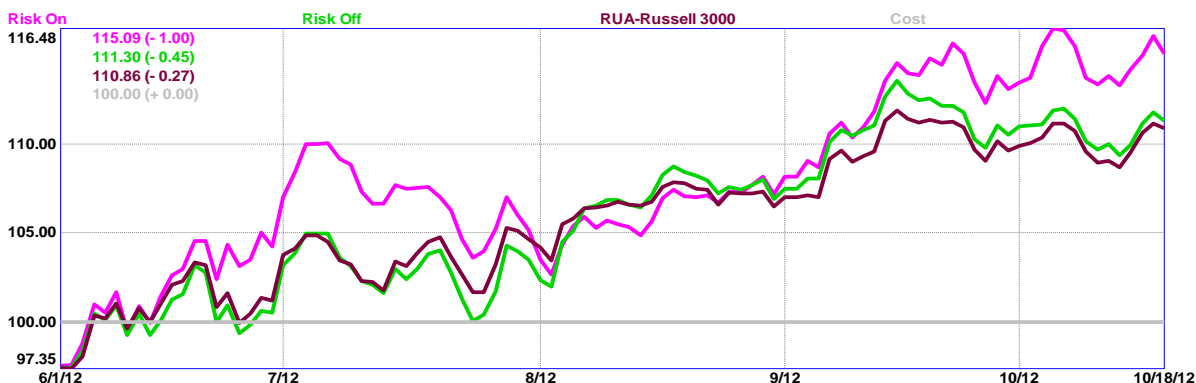
Risk-On and Risk-Off Indexes
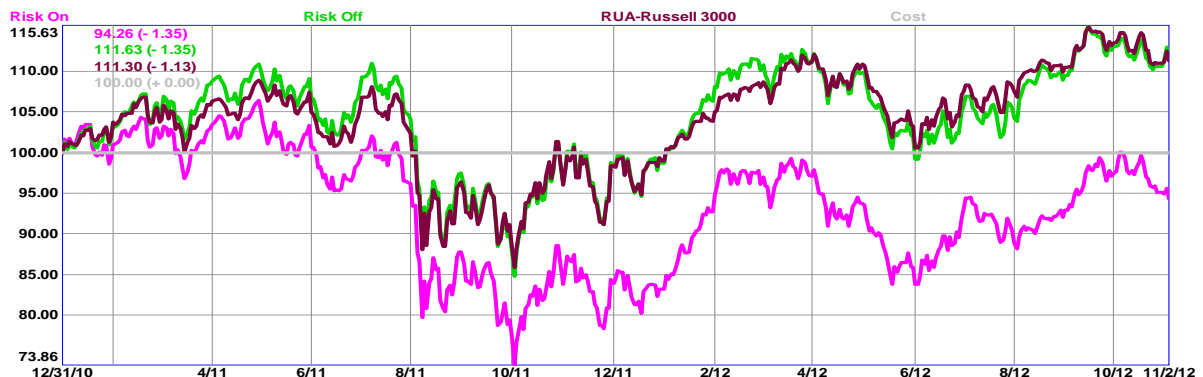
Since 1/1/2011 the risk-off index (quality) matches the Russell 3000 while the risk-on index (low-quality) is down 5%. For the last day (the numbers in parentheses in the upper left corner of the chart) both the risk-on and risk-off indexes were down -1.35%. It has been a nervous time for markets, as witnessed by the flow of money into bonds even when interest rates are historically low. While the market is edging up, it hasn't been going up fast enough to give the risk-on index the advantage. If we take ascending time periods from the chart above, such as shown in the charts below, the risk-on index matches and even exceeds by a hair both the risk-off index and the Russell 3000. The difference in the recent past hasn't been enough to merit the downside risk.

Risk-On and Risk-Off Indexes, 10/3/2011 to 2/6/2012, an up period.
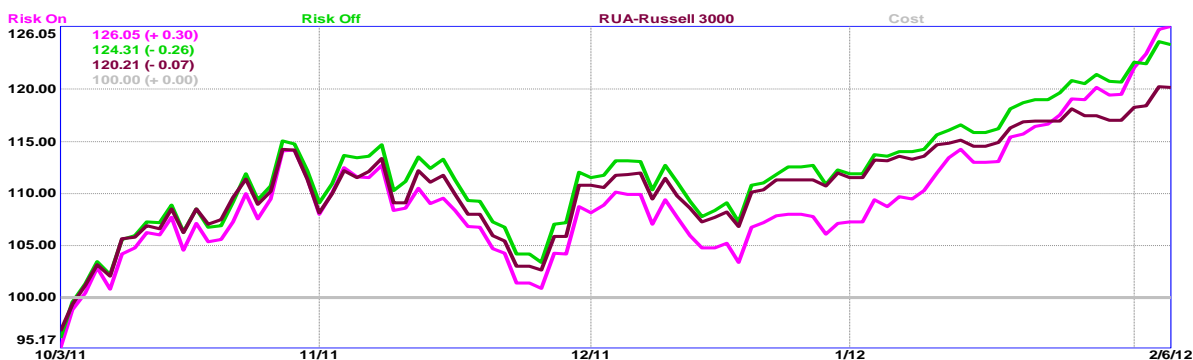
Risk-On and Risk-Off Indexes, 6/1/2012 to 10/18/2012, another up period.

Risk-On and Risk-Off Indexes, YTD.

The year-to-date chart above shows an interesting divergence the first quarter. So far it appears that there is a reversion to the mean. Note how the day before the election was a high-anxiety day, and the high quality stocks were double the market and the low-quality index.

Conclusion

Risk is a very confusing term. I have come to think of it as synonymous with volatility, which is how it is generally used and measured in financial writing. It can be seen as either danger or opportunity. The terms high quality and low quality are thus perhaps better terms. It is hard to find a screen that excels in both types of markets. It will be interesting to watch on a daily basis whether the high quality or low quality stocks are favored.

So do quality stocks give better returns? Yes, in down markets and markets with modest returns but not when the market is rapidly accelerating. If we move into a period of more confidence and a rising market, the risk-on stocks are likely to significantly surpass the risk-off or quality stocks.